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EXAMINER
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WILSON, MICHAEL H

ART UNIT	PAPER NUMBER
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1786

MAIL DATE	DELIVERY MODE
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09/01/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/561,739

**Applicant(s)**

BREUNING ET AL.

**Examiner**

MICHAEL WILSON

**Art Unit**

1786

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 July 2010 and 14 June 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2,6,8-14,17-22,24,26-29,32-36 and 38-41 is/are pending in the application.
- 4a) Of the above claim(s) 6,17-21,26-29,32,33,35,36 and 39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2,8-14,22,24,34,38,40 and 41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7 July 2010 has been entered.

2. It is noted that applicants' amendment filed 14 June 2010 which was previously not entered for the reasons set forth in the Advisory Action mailed 22 June 2010 has now been entered. The following action is based on this now entered amendment.

### ***Response to Amendment***

3. This Office action is in response to Applicant's amendment filed 7 July and 14 June 2010, which cancels claim 3, 4, 5, 7, 23, 25, and 37, amends claims 2, 6, 8-14, 17-22, 24, 26, 32, 34, 35, and 38, and adds new claims 40 and 41.

Claims 2, 6, 8-14, 17-22, 24, 26-29, 32-36, and 38-41 are pending.

4. Claims 6, 17-21, 26-29, 32, 33, 35-36, and 39 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 29 October, 2008.

5. The objection to claim 3 for informalities is moot because Applicants canceled the claim in the amendment filed 14 June 2010.
6. Applicants overcame the rejection of claims 2-4, 8-14, 22-24, and 34 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention by amending of cancelling the claims in the reply filed 14 June 2010.

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 2, 8-14, 22, 24, 38, 40 and 41 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 38, 40, and 41, the recitation of "a 9,9'-substituted fluorene, a spirobifluorene substituted by from 0 to 4 substituents R<sup>1</sup>, a 9,10- or 9,9,10,10-substituted dihydrophenanthrene, a stilbenyl or tolanyl system which bears from 0 to 2 substituents R<sup>1</sup> at the free positions or combinations of 2 or 3 of these systems" and "a 9,9'-substituted fluorene, a spirobifluorene substituted by from 0 to 4 substituents R<sup>1</sup>, a 9,10- or 9,9,10,10- substituted dihydrophenanthrene, a stilbenyl or tolanyl system which bears from 0 to 2 substituents R<sup>1</sup> at the free positions, or a combination of these systems" renders the claims indefinite because it is unclear if the systems referred too

are R and R" or *substituents* on R or R". Claims 2, 6, 8, 8-14, 22, 24, and 41 are indefinite by dependence.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 2, 8, 10-14, 22, 24, 34, 38, 40 and 41 are rejected under 35 U.S.C. 102(e) as being anticipated by Roberts et al. (US 200/0062930 A1).

Regarding claims 2, 8, 14, 34, 38, 40, and 41, Roberts et al. disclose a mixture (blend) comprising at least one conjugated polymer [0007], a bridged carbazole unit ([0086]-[0087], structure XCII), and a triplet emitter [0161]. Additionally, the reference discloses mixtures within the claimed ranges [0163]. The disclosed ranges correspond to approximately 40-95% by weight of at least one conjugated polymer, 7.5% (0.1\*75) or less of at least one bridged carbazole unit, wherein instant R (biphenyl) is a combination of two aromatic ring systems (benzene), and 0.05-10% by weight of at least one triplet emitter [0163]. Additionally, the reference discloses the conjugated polymer selected from the groups meta- or para- phenylenes, 1,4-naphthylenes, fluorenes, or indenofluorenes ([0065] pages 6-8 and [0083]). The reference discloses wherein a

bicarbazole unit is incorporated into the polymer via the 2, 7-position ([0086]-[0087], structure XCII). Additionally, the reference discloses wherein a compound of instant formula (II) is added to the mixture ([0391], CBP = bicarbazole-biphenyl).

Regarding claim 10, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally claim 10 only recites that when R and R<sup>1</sup> are an aryl or heteroaryl the compound is bound to the polymer via R<sup>1</sup>, whoever the claim does not require an R<sup>1</sup> to be present (i.e. n may still be 0). Therefore all the claim limitations are met as set forth above.

Regarding claim 11, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements of the polymer are selected from the groups meta- or para-phenylenes, 1,4-naphthylenes, fluorenes, or indenofluorenes ([0065] pages 6-8 and [0083]).

Regarding claim 12, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements which improve charge transport ([0085]-[0086]).

Regarding claim 13, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements are selected from the groups of the triarylaminines ([0087] structures XCIII to XCVI) or the oxadiazolylenes ([0073] structures LV to LVII, LIX, LXII, and LXIV to LXVII).

Regarding claim 22, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein any further molecules,

which may be low molecular weight, oligomeric, or polymeric, may also be added to the mixture [0163].

Regarding claim 24, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the total bicarbazole content is within the claimed range [0163]. The total content based on combining the weight of bicarbazole polymer units and the weight of CBP is approximately 57% by weight or less [0163].

#### ***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. Claims 2, 8, 10-14, 22, 24, 34, 38, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 200/0062930 A1) in view of Hu et al. (US 6,670,054 B1).

Regarding claims 2, 8, 10, 14, 34, 38, 40 and 41, Roberts et al. disclose a mixture (blend) comprising at least one conjugated polymer [0007], a bridged carbazole unit ([0086]-[0087], structure XCII), and a triplet emitter [0161]. Additionally, the reference discloses mixtures within the claimed ranges [0163]. The disclosed ranges correspond to approximately 40-95% by weight of at least one conjugated polymer, 7.5% (0.1\*75) or less of at least one bridged carbazole unit, wherein instant R (biphenyl) is a combination of two aromatic ring systems (benzene), and 0.05-10% by weight of at least one triplet emitter [0163]. Additionally, the reference discloses the conjugated polymer selected from the groups meta- or para- phenylenes, 1,4-naphthylenes, fluorenes, or indenofluorenes ([0065] pages 6-8 and [0083]). The reference discloses wherein a bicarbazole unit is incorporated into the polymer via the 2, 7-position ([0086]-[0087], structure XCII). Additionally, the reference discloses wherein a compound of instant formula (II) is added to the mixture ([0391], CBP = bicarbazole-biphenyl). However the reference does not explicitly disclose carbazole units with bridging groups which are not two benzene groups.

Hu et al. teach bicarbazole compounds for use in electroluminescent devices (abstract). The reference teaches that the linking groups between the carbazoles may be one of several different aryl and heteroaryl groups including phenyl, biphenyl, triphenyl, 9,10-anthracene, stilbenyl, 2,6-naphthylene and thiophene (column 4, line 59 to column 5, line 60). The reference recognized the equivalency of the groups by teaching then together as suitable linking units and teaches these compounds to be



suitable as suitable host materials in the a luminescent layer comprising phosphorescent material (column 7, lines 12-18).

In view of Hu et al.'s recognition that biphenyl, phenyl, 9,10-anthracene, stilbenyl, 2,6-naphthylene and thiophene are equivalent and interchangeable, it would have been obvious to one of ordinary skill in the art to substitute biphenyl with phenyl, 9,10-anthracene, stilbenyl, 2,6-naphthylene or thiophene. Case law holds that the mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See *In re Ruff* 118 USPQ 343 (CCPA 1958). Additionally because Roberts et al. discloses that a bicarbazole with a biphenyl linker as suitable for the polymer of Roberts et al. et al. one of ordinary skill in the art would reasonably expect other monomeric equivalents of bicarbazole with a biphenyl linker to also be suitable.

Additionally it would be obvious to one of ordinary skill in the art to substitute biphenyl linking group in CBP with phenyl, 9,10-anthracene, stilbenyl, 2,6-naphthylene or thiophene. Case law holds that the mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See *In re Ruff* 118 USPQ 343 (CCPA 1958). Further one of ordinary skill in the art would reasonably expect such a combination to be suitable given that both references teach biphenyl to be a suitable linking group of a bicarbazole compound while Hu et al. teach additional linking groups to be equally suitable. This would lead

one of ordinary skill in the art to expect bicarbazole compounds with the linking groups of Hu et al. to have similar properties and be suitable for the same purpose.

Regarding claim 10, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally claim 10 only recites that when R and R<sup>1</sup> are an aryl or heteroaryl the compound is bound to the polymer via R<sup>1</sup>, whereas the claim does not require an R<sup>1</sup> to be present (i.e. n may still be 0). Therefore all the claim limitations are met as set forth above.

Regarding claim 11, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements of the polymer are selected from the groups meta- or para-phenylenes, 1,4-naphthylenes, fluorenes, or indenofluorenes ([0065] pages 6-8 and [0083]).

Regarding claim 12, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements which improve charge transport ([0085]-[0086]).

Regarding claim 13, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements are selected from the groups of the triarylamines ([0087] structures XCIII to XCVI) or the oxadiazolylenes ([0073] structures LV to LVII, LIX, LXII, and LXIV to LXVII).

Regarding claim 22, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein any further molecules,

which may be low molecular weight, oligomeric, or polymeric, may also be added to the mixture [0163].

Regarding claim 24, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the total bicarbazole content is within the claimed range [0163]. The total content based on combining the weight of bicarbazole polymer units and the weight of CBP is approximately 57% by weight or less [0163].

14. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 200/0062930 A1) as applied to claim 40 above in view of Maxted et al. (WO 03/074628 A).

Regarding claim 9, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the bicarbazole unit is incorporated into the polymer via the 2, 7 -position ([0086]-[0087]). However the reference does not disclose the bicarbazole unit bound via the 3, 3'-position.

Maxted et al. teach a similar charge transporting polymer comprising a bicarbazole unit (page 9, compound KLCBP1). The reference teaches the bicarbazole may be bound via the 3, 3'-position.

It would be obvious to one of ordinary skill in the art at the time of the invention to connect the bicarbazole unit of Roberts via the 3, 3'-position, as taught by Maxted et al., in the polymer of Roberts et al. One of ordinary skill would reasonably expect such a polymer to have similar properties and be suitable for the same purpose given that

Maxted et al. 3, 3'-bound bicarbazole units as suitable for charge transfer polymers (page 9, first full paragraph), suitable for use in electroluminescent devices (abstract). One of ordinary skill would be motivated by a desire to optimize the physical properties of the polymer as the specific connectivity of a polymer is known to directly affect the physical properties of the material.

15. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 200/0062930 A1) in view of Hu et al. (US 6,670,054 B1) as applied to claim 40 above and further in view of Maxted et al. (WO 03/074628 A).

Regarding claim 9, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the bicarbazole unit is incorporated into the polymer via the 2, 7 -position ([0086]-[0087]). However the reference does not disclose the bicarbazole unit bound via the 3, 3'-position.

Maxted et al. teach a similar charge transporting polymer comprising a bicarbazole unit (page 9, compound KLCBP1). The reference teaches the bicarbazole may be bound via the 3, 3'-position.

It would be obvious to one of ordinary skill in the art at the time of the invention to connect the bicarbazole unit of Roberts via the 3, 3'-position, as taught by Maxted et al., in the polymer of Roberts et al. One of ordinary skill would reasonably expect such a polymer to have similar properties and be suitable for the same purpose given that Maxted et al. 3, 3'-bound bicarbazole units as suitable for charge transfer polymers (page 9, first full paragraph), suitable for use in electroluminescent devices (abstract).

One of ordinary skill would be motivated by a desire to optimize the physical properties of the polymer as the specific connectivity of a polymer is known to directly affect the physical properties of the material.

### ***Response to Arguments***

16. Applicant's arguments filed 14 June 2010 have been fully considered but they are not persuasive.

Applicants argue that Roberts et al. does not disclose a separate bridged carbazole unit of the formula (II) however as stated in the Office Action mailed 15 March 2010 Roberts et al. does disclose such a mixture in paragraph [0391].

Applicants also argue that the examiner has not shown why one of ordinary skill in the art would substitute the carbazole of Roberts et al. with the one of Hu et al. However, as discussed in MPEP§ 2144, if the facts in a prior legal decision are sufficiently similar to those in an application under examination, the examiner may use the rationale used by the court. Case law holds that the mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See *In re Ruff* 118 USPQ 343 (CCPA 1958). Hu et al. clearly teaches several linking groups in columns 9-11 which overlap with the presently claimed groups and clearly teaches dicarbazole compounds with these linking groups to be suitable for the same purpose. Further equivalent and interchangeable does not mean identical, but that the groups are similar, any change to

a compound will alter the compounds properties. Replacing a group with another that is equivalent and interchangeable will give a compound one of ordinary skill in the art could reasonably expect to have similar properties and be suitable for the same purpose. The specific properties may be slightly different from the original compound but the overall property would remain the same. For example a hole transporting compound may have slightly more or less hole mobility when equivalent groups are interchanged, but the compound would still remain hole transporting.

Applicants also argue that none of the secondary references disclose the combination of claim limitations (A) to (C) (on page 31 of Remark). However the rejections of record do not rely of a secondary reference to teach this combination of limitations. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Additionally Applicants argue that the statement that modifications of the prior art to meet the claimed invention would have been "obvious to one of ordinary skill in the art at the time the invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. However the examiner notes that both motivation to combine and the reasons one of ordinary skill in the art would reasonably expect success have previously been articulated in the rejections of record. Therefore the

rejections do not merely make the conclusory statement, but articulate reasoning with rational underpinning to support the conclusion of obviousness.

Further Applicants argue that the Examiner cannot selectively pick and choose from the disclosed parameters without proper motivation as to a particular selection; and asserts that the mere fact that a reference may be modified to reflect features of the claimed invention does not make the modification, and hence the claimed invention obvious unless the prior art suggested the desirability of such modification. Thus, applicants argue that that the examiner used impermissible hindsight reasoning. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). The rejections of record only use knowledge which was within the level of ordinary skill at the time the claimed invention was made with motivation to combine coming explicitly or implicitly from the cited references and not from applicant's specification. Therefore the rejections of record are not based on impermissible hindsight reasoning.

Last Applicants assert evidence of "better results", while this argument relates to the claim amendment which is not entered the standard for overcoming an obviousness rejection is unexpected results, not better results.

***Conclusion***

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL WILSON whose telephone number is (571) 270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/  
Supervisory Patent Examiner, Art Unit 1786

MHW



